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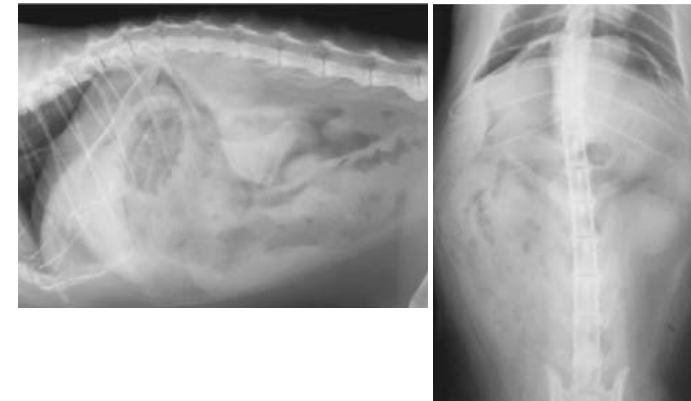
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What's Your Diagnosis?

By Pat Rose DACVS, DACVR

Here's another installment of our occasional feature that asks you to review a case study to see if you can come up with the correct diagnosis. Look inside to find the answer.

SIGNALMENT: 14-year-old FS Siamese
HISTORY: Vomiting, anorexia for three days. Very elevated white blood count with marked left shift.



Forward Thinking

Axlund's Pioneering Treatment for Cushing's Disease

by Todd Axlund, DVM, MS, ACVIM (Neurology)

Hyperadrenocorticism (Cushing's disease) is one of the most common canine endocrinopathies. It is caused by either a functional adrenal tumor (15 percent) that secretes cortisol or an autogenously functioning pituitary tumor (85 percent) that secretes adrenocorticotropic hormone (ACTH). The excess ACTH then stimulates the adrenal glands to secrete high levels of cortisol. In either case, the elevated levels of cortisol result in the clinical manifestations of Cushing's disease. In addition, approximately 25 percent of pituitary tumors will cause neurological dysfunction when they reach a certain size.

Ideally, therapy for Cushing's disease should be directed at the specific cause. This is the case for adrenal tumors where surgical removal is the treatment of choice. Pituitary-dependent cases, on the other hand, are traditionally treated medically with drugs that target the adrenal gland. Mitotane will chemically ablate the adrenal cortex, effectively decreasing the ability of the gland to produce cortisol. A newer drug, trilostane, competitively inhibits an enzyme necessary in the synthesis of cortisol. Both drugs may be associated with potentially life-threatening side effects, are

costly, and require frequent laboratory testing to titrate the effective dosages. Both drugs also leave the primary pituitary tumor untouched. An alternate approach is surgical removal of the tumor itself. This can only be performed before the tumor reaches 1 cm in vertical height.

Dr. Axlund at Ohio Veterinary Surgery and Neurology developed a new approach to the pituitary gland during his faculty tenure at Auburn University College of Veterinary Medicine. His research has been published in *Veterinary Surgery* and presented at national veterinary conferences. Previous surgical approaches access the sphenoid bone through an open mouth. Dr. Axlund instead makes a small paramandibular incision through the ventral neck. Once the mandibular and glossal soft tissues have been retracted and the sphenoid visualized, the bone is carefully removed just ventral to the pituitary gland. The precise nature of this procedure requires exact localization of the gland using either CT or MRI (figures 1-4). Once the pituitary is reached, the entire hypophysis is removed by manual extirpation or by ultrasonic surgical aspiration. Removal of the tumor alone would be ideal, however, the limited field of view and small size of the mass make it visually indistinct from the normal pituitary. Therefore, the entire gland is removed and the patient is supplemented post-operatively with the necessary hormones. The cavity that remains in the sphenoid bone is packed with wax or Gelfoam, and the mucosal layers apposed and closed using absorbable suture material. Dr. Axlund has performed this technique successfully on a number of research and clinical patients, both at Auburn and at OVSN.

Post-operative management is divided into immediate, short-term, and long-term care. The immediate concern is volume maintenance. The posterior pituitary is removed with the rest of the gland and the tumor, thus eliminating the source of anti-diuretic hormone (ADH). The patient will temporarily lose the ability to concentrate urine and a significant diuresis will ensue. Serum electrolyte levels must be carefully monitored as severe hyponatremia can occur. Isotonic fluid low in sodium (0.45 percent NaCl + 2.5 percent dextrose) should be administered and synthetic ADH (DDAVP, one drop daily into the conjunctival sac) given to aid in volume maintenance. A full course of a broad spectrum antibiotic is started because surgery is performed in a non-sterile environment. Corticosteroids are implemented, at a physiological dose (0.25 mg/kg PO once or twice daily), as are post-operative analgesics.

Short-term care (days one through 10) consists of continued monitoring of serum electrolytes as well as administration of synthetic ADH, antibiotics and corticosteroids. Because the ability to secrete thyrotropin-stimulating hormone (TSH) has been eliminated, thyroxine supplementation should begin at this point (0.01 mg/lb PO BID). Although other pituitary hormones will be missing, it is not necessary to replace any other than those described here. Patients will no longer be able to breed; however, this is usually not a concern because most are beyond breeding age or already neutered. An infrequent complication of hypophysectomy is KCS, so monitoring of tear production in this time period is also important. Patients are encouraged to eat and drink 24 hours after surgery and are generally eager to do so.

Long-term care is minimal in the majority of cases. Most patients will be able to form concentrated urine by the tenth day post-operatively. If not, continued administration of synthetic ADH is indicated. Thyroxine and prednisone will need to be given for the rest of the animal's life. Biannual examination for recurrence of clinical signs, and necessary screening tests, are recommended to monitor for loss of remission.

Hypophysectomies have been performed as a matter of routine in the Netherlands for a number of years and have offered encouraging results. Forty-three out of the first 52 clinical cases went into clinical remission after hypophysectomy. Of these 43 cases, all but five cases remained in remission for the duration of the study (two years) and required no further treatment for Cushing's disease. Dr. Axlund's personal experience with his technique is similar to that of published reports. While this treatment is not curative in every case of pituitary-dependent hyperadrenocorticism, the success rate and relative safety of this procedure make it

a viable alternative to standard medical therapy in many cases. Please feel free to contact Dr. Axlund at the Metropolitan Veterinary Hospital if you have a case that you feel would benefit from this procedure.

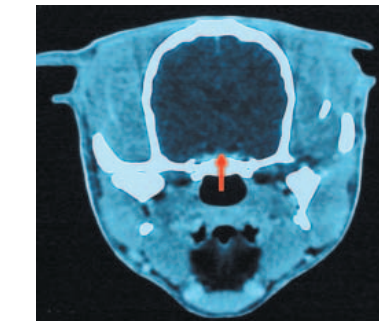


Figure 1: Axial computed tomographic (CT) image of a dog's brain with a small pituitary tumor (arrow) after injection of an intravenous contrast agent.

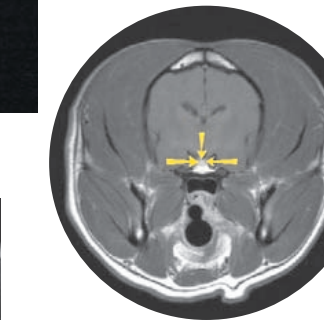


Figure 2: Axial magnetic resonance image (MRI) of a dog's brain (different patient than Figure 1) with a small pituitary tumor (arrows) after injection of an intravenous contrast agent.

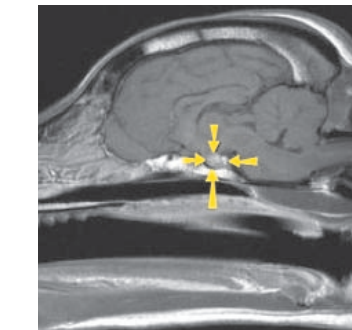


Figure 3: Same animal as in Figure 2. Sagittal image of the pituitary gland (arrows).

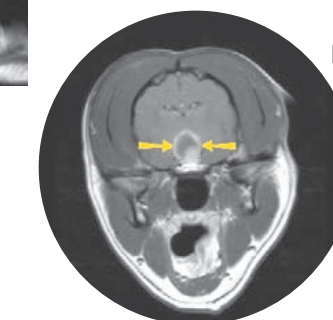


Figure 4: Axial post contrast MRI of a dog's brain with a pituitary macrotumor (arrows). This tumor is greater than 1 cm in vertical height, making the dog no longer a surgical candidate.



Future Notes

Hear Metropolitan Veterinary Referral Group Members Presenting at Conferences

Sept. 19, 2008 – Columbus Zoo, PCCA Veterinary Conference – Dr. Riggs' topic, "Avian and Exotic Animal Medications"

Oct. 13, 2008 – Association of Zoo Veterinarians, Los Angeles – Dr. Riggs' topic, "Conservation of an Endangered Avian Species"

Oct. 23-25, 2008 – ACVS Symposium, San Diego – Dr. Conkling's topic, "Comparison of Tibial Plateau Angle Changes after Tibial Plateau Leveling Osteotomy with Traditional Versus Locking Screw Technology"

Oct. 28-30, 2008 – Ross University College of Veterinary Medicine – Dr. Riggs' topic, "Avian and Exotic Medicine and Surgery"

Nov. 7-9, 2008 – Ohio Wildlife Rehabilitators Association Annual Conference, Columbus – Dr. Riggs' topics, "Veterinary Care of Wildlife," "Conservation Programs"



Specialist Spotlight

Chronic Sinusitis in an Amazon Parrot

By Kimberly Cook DVM, North Coast Bird & Exotic Specialties

Casey, an approximately eighteen-year-old female yellow-naped Amazon, presented with sneezing and nasal discharge that progressed from serous to a thick malodorous mucopurulent exudate.

Sinusitis in birds is associated with an accumulation of exudates within the infraorbital sinus, in part due to the dorsal location of the openings into the nasal conchae. The anatomy of the avian upper respiratory system is specialized and much different from that of mammals. Although these evolutionary differences have made the avian respiratory system very efficient, they also predispose birds to different respiratory disorders than those of mammals.

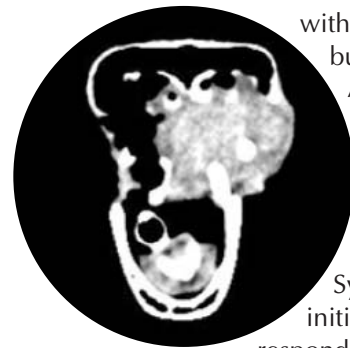
At initial presentation for his serous sinusitis, Casey was empirically started on ciprofloxacin and saline/F-10 nebulization. Clinical signs progressed to mucopurulent nasal discharge (only on the right side), intermittent right ocular bubbling and increased lethargy. Therapy was then changed to ceftazidime intramuscularly, nasal flushes of F-10 solution, and F-10 nebulization was continued. Meloxicam also was used intermittently when it seemed that Casey was not feeling well. Clinical signs progressed to swelling of the right side of the face cranially and ventrally to the eye.



Since the sinusitis was not resolving, Casey was anesthetized and radiographs were taken. Skull films indicated opacity within the right sinus cavity and possible mild bone involvement. A sinus aspirate recovered thick purulent material that was sent for culture and cytology.

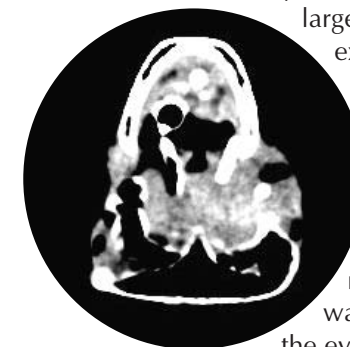
Cytology of the aspirate material revealed heterophilic-granulomatous inflammation with mild epithelial dysplasia. Culture of the material revealed heavy growth of *Pseudomonas aeruginosa* and *E. coli*. PCR for *Mycoplasma* sp. was negative. Combination therapy was initiated with amikacin and ciprofloxacin for 21 days. F-10 nebulization and nasal flushes were continued. After seven days of this combination of therapies, Casey had decreased facial swelling, complete cessation of nasal discharge and increased activity level; however, there was still some increased inspiratory noise and residual facial swelling.

After discontinuing therapy, the serous nasal discharge returned. Another culture was taken, and Casey was treated

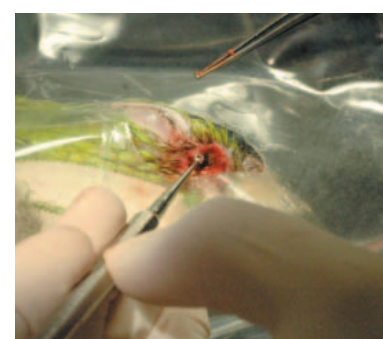


with ceftazidime and nebulization but did not respond completely. After a third culture, Casey was anesthetized with isoflurane and pluronic (a biodegradable thermogenic gel) impregnated with amikacin was injected into the infraorbital sinuses bilaterally. Systemic therapy with Zosyn was initiated for three weeks. Casey responded exceptionally well to this therapy and nasal discharge ceased almost immediately; however, mild inspiratory noise continued when she was excited and breathing more heavily than normal. About two weeks after discontinuing therapy, the serous nasal discharge returned.

Due to the chronicity, it was decided to perform a CT scan of Casey's skull. Results of the scan revealed a large amount of material with boney extension in the caudal portions of the sinuses on the right side, despite vigorous flushing and suctioning of the sinuses prior to imaging. Following CT, Casey was taken to surgery for exploratory/debridement of the right sinus network. An incision was made cranial and ventral to the eye into the infraorbital sinus.



A large amount of thick purulent debris was immediately evident. The infection extended well up into the hollow nasal cavity of the upper beak. All evident debris was removed with a microcurette and microsaws. The sinus was filled with amikacin impregnated pluronic gel once again, and the incision was closed. Casey was treated post-operatively with nalbuphine, meloxicam, Zosyn and nebulization for several weeks.



Casey did well post-op. Follow-up several months later revealed Casey displays no evidence of nasal discharge; however she does have some degree of increased inspiratory noise when excited. She has been off all treatments for three months.

AVIMP Welcomes New Doctor

Drs. Carothers, Gamblin, Perdion and Thalhoffer are pleased to announce the addition of another internal medicine doctor. Dr. Greg Chambers comes to Metropolitan Veterinary Referral Group from California Animal Hospital in Los Angeles. He graduated from Texas A&M University Veterinary School in 2004. He then completed a one-year internship at Oklahoma State University. Dr. Chambers has just completed a three-year small animal internal medicine residency at California Animal Hospital under the direction of Dr. Steve Ettinger.



Dr. Chambers authored a chapter on abdominal distention, ascites and peritonitis to be published in the next edition of Ettinger and Feldman, expected next year. He also has lectured at the Golden State Veterinary Conference.

While he is interested in all areas of internal medicine, Dr. Chambers has special interest in gastrointestinal (including liver and pancreas), endocrine, pulmonary, renal and immune-mediated diseases.

Dr. Chambers believes in partnering with referring veterinarians for the diagnosis and treatment of diseases. He also plans on visiting veterinary clinics in the local area to discuss potential internal medicine services. If you are interested in having him visit your clinic, please contact him directly or leave a message with the Akron Veterinary Internal Medicine/Oncology Practice of Metropolitan Veterinary Referral Group.

Dr. Chambers is available for referral appointments beginning Aug. 4. To make an appointment with him, please contact the Akron Veterinary Internal Medicine/Oncology Practice of Metropolitan Veterinary Referral Group at 330.670.2351.

Moving to Ohio, Chambers is joined by his wife, Wendy, and his furry friends Anna (Lab mix), Lily (Airedale) and Sam (abyssinian/Maine coon mix). In his spare time, he enjoys spending time with his family, mountain biking, hiking,

Contact Us

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Practice Points

Animals benefit from massage therapy the same way people do, so **Dancing Paws Animal Wellness Center** is now offering massage packages for dogs and cats! Massages will increase circulation, reduce buildup of fibrous tissue adhesions caused by trauma or wounds, and contribute to relaxing the nervous system. It can help improve agility and obedience in dogs and increase range of motion of the joints. Massage can provide numerous benefits to dogs during cage rest; it decreases stagnation of the lymphatic system and speeds healing time. Highly trained staff will strive to ensure complete client satisfaction and work hard to keep you informed of treatment plans. Please consider sending your patients to Dancing Paws for a relaxing and highly beneficial massage visit!

Thanks to your support, the **Akron Veterinary Internal Medicine/Oncology Practice** continues to grow. We are pleased to announce the addition of another internal medicine doctor. Dr. Greg Chambers is starting with us in August. We also have added two new RVTs, Chris Nutial and Rhonda Prochaska. Just a reminder, we have a doctor assigned every day to assist referring veterinarians with phone consults and emergencies. If you have any problems, questions, suggestions or would like to shadow our practice please call Michelle Fast at 330.664.6509 or e-mail her at m.fast@metropolitanvet.com. We will continue to strive to provide the best service available for referring veterinarians and their clients/patients.

North Coast Bird & Exotic Specialties is a referral veterinary practice limited to birds and exotic pets. Our staff consists of Gary Riggs, DVM, ABVP: Avian, and Kimberly Cook, DVM, along with our five-member, specially trained exotic technical staff. Our patients include birds, fish, amphibians, reptiles, ferrets, rabbits, rodents and other exotic mammals. We offer a wide range of avian and exotic medical and surgical capabilities including laser, endoscopy, and micro, orthopedic and laparoscopic surgery. Our full-service practice includes comprehensive diagnostic and hospital care utilizing ultrasound, CT scans and MRI procedures for all types of exotic pet species. Whether it's for emergency exams and health screens or for treatment of a serious chronic illness, we have the staff, experience, equipment and hospitalization facilities to offer maximum care for your exotic pet. North Coast staff is on-site every day to attend to the needs of your clients' pets. Call us to schedule at 1.877-NC.EXOTIC (1.877.629.6842).

Drs. Padgett, Daye, Bowman, Axlund and Conkling of **Ohio Veterinary Surgery and Neurology** are proud to make the following additions to our team. Dr. Jennifer Bibeovski is joining us for three years as an ACVS resident in small animal surgery. Dr. Bibeovski is an Ohio State University graduate and has finished a rotating general internship and subsequent surgical internship here at Metropolitan Veterinary Hospital. Dr. Dana Gietzen is joining us for three years as an ACVIM resident in neurology and neurosurgery. Dr. Gietzen is an Iowa State University graduate and has finished an internship in emergency and critical care at Iowa State University and subsequent surgical internship here at Metropolitan Veterinary Hospital. Dr. Steven Moody is joining us for a one-year small animal surgical internship. Dr. Moody is an Auburn University graduate who has just finished a rotating small animal surgical and medicine rotating internship here at Metropolitan Veterinary Hospital.

Help us Update our Mailing List

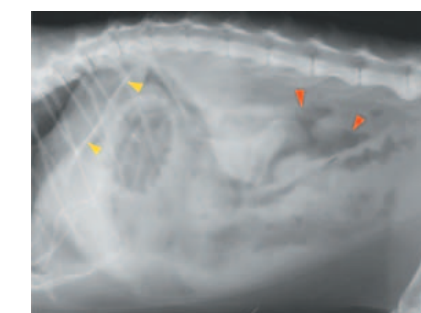
You can assist in our efforts to keep pace with the changing local veterinary population. If you are receiving copies of this newsletter for someone no longer at your practice or would like to add someone, please call Kelli Riley at 330.670.2355. Thank you!

Answer - What's Your Diagnosis?

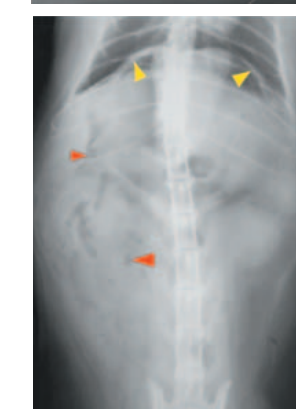
By Pat Rose DACVS, DACVR

The abdominal organs are difficult to define in this patient. This is due to a loss of abdominal detail throughout the abdominal cavity. Causes of loss of abdominal detail include the presence of free abdominal fluid +/- serosal inflammation.

The cranial abdominal cavity has an unusually lucent appearance and the abdominal surface of the diaphragm is visible, as is the serosal surface of the gastric wall (yellow arrows). This is due to the presence of a large "bubble" of air free within the abdominal cavity. A second area of free gas accumulation is seen caudal to the renal silhouettes (red arrows). Small indistinct gas bubbles that have no relationship to intestinal structures also are seen scattered throughout the abdomen.



As in the lateral view, the abdominal surface of the diaphragm is clearly visible in the ventrodorsal view (yellow arrows). The abdominal surface of the diaphragm is not normally seen because it is in direct contact (silhouettes) with the liver. When free air is present, the liver is displaced away from the diaphragm and the air outlines the abdominal surface of the diaphragm. The triangular soft tissue opacity on the midline from the ninth to thirteenth thoracic vertebra is the falciform fat pad. It remains attached to the ventral abdominal wall, and the air



surrounds it on either side when the patient is in dorsal recumbency. Recognition of these changes is key to making a diagnosis of free abdominal air.

Small indistinct gas bubbles that have no relationship to intestinal structures are present throughout the abdomen (red arrows) and abdominal detail is poor. Notice the "fuzzy" appearance around the head of the spleen – this is evidence of free abdominal fluid at this location.

The kidneys are visible in this view and are small (especially the left one) and rounded in shape. This is an older cat and these renal changes are likely evidence of chronic renal disease and unrelated to the current clinical presentation.

These findings are considered evidence of free abdominal air and free abdominal fluid. The reason for these changes cannot be determined from the radiographs. But, there are really only three scenarios that could account for these radiographic changes:

- Recent abdominal surgery
- Penetrating wound of the abdominal wall ("big dog - little cat" syndrome or other traumatic incident)
- Rupture of a part of the gastrointestinal tract (hollow viscus)

The patient has no history of recent abdominal surgery or of any trauma. Therefore rupture of a hollow viscus is the most likely cause of the free air. Rupture could be due to penetration of the gastrointestinal tract by an intestinal foreign body or due to the presence of intestinal neoplasia (with secondary ulceration). Unfortunately, in this geriatric patient, neoplasia is most likely.